NONINVASIVE IMAGING OF ANTI-A ß MURINE MONOCLONAL ANTIBODY FAB LABELED WITH TECHNETIUM 99m IN ALZHEIMER'S DISEASE.

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ABSTRACT Alzheimer's disease (AD) is accompanied by deposition of the amyloid ß protein (Aß) in cerebral vessels including arteries and capillaries. We have developed a murine monoclonal antibody referred to as 10H3 which targets the Aß protein and has been mass produced. 10H3 Fab fragments were radiolabeled with Tc-99m using a preformed diamide dimercaptide chelate system. Radiolabeled Fab fragments retain activity and specificity towards amyloidotic vessels and neuritic plaques. Biodistribution studies in mice demonstrate desirable properties for use as an imaging agent in patients (high volume of distribution and rapid clearance from blood). Preliminary studies using single photon emission computer tomography (SPECT) in AD demonstrate rapid entry of the labeled Fab into the blood pool of the brain along with uptake in liver, kidney, and bladder. Uptake in whole blood is 1-2 % injected dose per dl at 15 minutes after injection, and 0.4-0.5 % injected dose per dl at 5 hours (N=2). Plasma contains 94 % (plus minus 2%) of whole blood activity and at 6 hours 1% (plus minus 1 %) of Tc-99m is free in the blood. Images obtained 17 hours after injection continue to show activity in the venous sinuses, and accumulation of the label in the tissues outside the brain (scalp and/or bone marrow). Skin biopsies obtained in the same patients (N=5) are being studied for evidence of amyloid deposition.